UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/865,001	05/24/2001	Marc Noel Blais	ROC9-2000-0162-US1	3815

46296 7590 10/27/2004	EXAMINER
MARTIN & ASSOCIATES, LLC IBM INTELLECTUAL PROPERTY LAW DEPARTMENT DEPARTMENT 917, BUILDING 006-1 3605 HIGHWAY 52 NORTH ROCHESTER, MN 55901-7829	ALI, SYED J

ART UNIT	PAPER NUMBER
2127	

DATE MAILED: 10/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	09/865,001	BLAIS ET AL.
	Examiner	Art Unit
	Syed J Ali	2127

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>24 May 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-18</u> is/are pending in the application.

 4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-18</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>24 May 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

 a)☐ All b)☐ Some * c)☐ None of:

  1.☐ Certified copies of the priority documents have been received.

  2.☐ Certified copies of the priority documents have been received in Application No. _____.

  3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

U.S. Patent and Trademark Office

PTOL-326 (Rev. 1-04)   Office Action Summary   Part of Paper No./Mail Date 09292004

DETAILED ACTION

1.   Claims 1-18 are pending in this application.

Double Patenting

2.   **Claims 1-18 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-2, 6, 13-16and 18-20 of copending Application No. 09/812,619 (Schmidt).**

3.   While the conflicting claims are not identical, they are not patentably distinct from each other because the "first compilation unit" of the instant application is referred to more broadly as "an object oriented program" in Schmidt. Essentially, the "first compilation unit" is a set of classes, which is encompassed by the "object oriented program" that is claimed in Schmidt. There are numerous corresponding dependent claims as well. Other independent claims of the instant application are related to claim 1.

       This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 102

4.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5.   **Claims 1, 4, 6, 8, 10-12, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Whaley et al. ("Compositional Pointer and Escape Analysis for Java Programs") (hereinafter Whaley).**

6.   As per claim 1, Whaley teaches the invention as claimed, including an apparatus, comprising:

at least one processor (Abstract);

a memory coupled to the at least one processor (Abstract);

a first compilation unit residing in the memory, the first compilation unit comprising a plurality of object oriented classes that are part of an object oriented program, wherein the object oriented program is defined by the combination of the first compilation unit and at least one other compilation unit (§§ 3.1, 3.2); and

a compiler residing in the memory and executed by the at least one processor (§1.2), the compiler allocating at least one object in the first compilation unit to an invocation stack frame for a method in the first compilation unit that allocates the at least one object (§7.2).

7.   As per claim 4, Whaley teaches the invention as claimed, including the apparatus of claim 1 wherein the compiler comprises:

a code generator that creates two versions of code for a selected object method, a first version using stack allocation of objects (§7.2) and a second version using heap allocation of objects (§§1.1, 7.2); and

a run time code selector that selects one of the first and second versions to execute

at run time based on a determination of whether classes seen at run time match expected

classes within predetermined limits (§§1.2, 7.2, 8.1).

8.   As per claim 6, Whaley teaches the invention as claimed, including a method for

allocating objects to memory in an object oriented program that comprises a first

compilation unit and at least one other compilation unit (§§3.1, 3.2), the method

comprising the steps of:

(A)   compiling the first compilation unit (§1.2);   .

(B)   during the compiling of the first compilation unit, allocating at least one

object that is created by an instruction in the first compilation unit to an

invocation stack frame for a method that allocates the at least one object (§7.2).

9.   As per claim 8, Whaley teaches the invention as claimed, including the method of

claim 6 wherein step (B) comprises the steps of:

creating two versions of code for a selected object method, a first version using

stack allocation of objects (§7.2) and a second version using heap allocation of objects

(§§1.1, 7.2); and

selecting at run time one of the first and second versions to execute at run time

based on a determination of whether classes seen at run time match expected classes

within predetermined limits (§§1.2, 7.2, 8.1).

10.   As per claim 10, Whaley teaches the invention as claimed, including a program

product comprising:

        a compiler that compiles a first compilation unit comprising a plurality of object

oriented classes that are part of an object oriented program (§1.2), wherein the object

oriented program is defined by the combination of the first compilation unit and at least

one other compilation unit (§§ 3.1, 3.2), the compiler allocating at least one object in the

first compilation unit to an invocation stack frame for a method in the first compilation

unit that allocates the at least one object (§7.2); and

        signal bearing media bearing the compiler (Abstract).

11.   As per claim 11, Whaley teaches the invention as claimed, including the program

product of claim 10 wherein the signal bearing media comprises recordable media

(Abstract).

12.   As per claim 12, Whaley teaches the invention as claimed, including the program

product of claim 10 wherein the signal bearing media comprises transmission media

(Abstract).

13.   As per claim 15, Whaley teaches the invention as claimed, including the program

product of claim 10 wherein the compiler comprises:

        a code generator that creates two versions of code for a selected object method, a

first version using stack allocation of objects (§7.2) and a second version using heap

allocation of objects (§§1.1, 7.2); and

a run time code selector that selects one of the first and second versions to execute

at run time based on a determination of whether classes seen at run time match expected

classes within predetermined limits (§§1.2, 7.2, 8.1).

Claim Rejections - 35 USC § 103

14.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

15.   **Claims 2-3, 5, 7, 9, 13-14, and 16-18 are rejected under 35 U.S.C. 103(a) as**

being unpatentable over Whaley in view of Choi et al. ("Escape Analysis for Java")

(hereinafter Choi).

16.   As per claim 2, Choi teaches the invention as claimed, including the apparatus of

claim 1 wherein the compiler comprises:

an escape analysis mechanism that marks each instruction in the first compilation

unit that allocates a new object as one of global escape, no escape, and arg escape based

on information available from classes visible in the first compilation unit (§2.1,

Proposition 2.3); and

an object allocation mechanism that allocates at least one object that is created by

an instruction marked as no escape by the escape analysis mechanism to an invocation

stack frame for a method that allocates the object (§2.1, Proposition 2.3).

17.   It would have been obvious to one of ordinary skill in the art to combine Whaley

and Choi since the markings provided by Choi provides a simple data model for the

extensive analysis procedures performed by Whaley (Choi, Abstract; Whaley, §§1-1.2).

18.   As per claim 3, Choi teaches the invention as claimed, including the apparatus of

claim 2 wherein the escape analysis mechanism marks each instruction in the first

compilation unit that allocates a new object as one of global escape, no escape, and arg

escape based on information available from classes visible in the first compilation unit

(§2.1, Proposition 2.3) and from classes that are outside the first compilation unit that are

visible in a specified classpath (§§2.1, Proposition 2.3; 4).

19.   As per claim 5, Whaley teaches the invention as claimed, including an apparatus

comprising:

      at least one processor (Abstract);

      a memory coupled to the at least one processor (Abstract);

      a first compilation unit residing in the memory, the first compilation unit

comprising a plurality of object oriented classes that are part of an object oriented

program, wherein the object oriented program is defined by the combination of the first

compilation unit and at least one other compilation unit (§§ 3.1, 3.2); and

      a compiler residing in the memory and executed by the at least one processor

(§1.2), the compiler comprising:

a code generator that creates two versions of code for a selected object method, a first version using stack allocation of objects (§7.2) and a second version using heap allocation of objects (§§1.1, 7.2); and

a run time code selector that selects one of the first and second versions to execute at run time based on a determination of whether classes seen at run time match expected classes within predetermined limits (§§1.2, 7.2, 8.1).

20.   Choi teaches the invention as claimed, including the compiler further comprising:

an escape analysis mechanism that marks each instruction in the first compilation unit that allocates a new object as one of global escape, no escape, and arg escape based on information available from classes visible in the first compilation unit and from classes that are outside the first compilation unit that are visible in a specified classpath (§2.1, Proposition 2.3); and

an object allocation mechanism that allocates at least one object that is created by an instruction marked as no escape by the escape analysis mechanism to an invocation stack frame for a method that allocates the object (§2.1, Proposition 2.3).

21.   As per claim 7, Choi teaches the invention as claimed, including the method of claim 6 wherein step (B) comprises the steps of:

marking each instruction that allocates a new object as one of global escape, no escape, and arg escape based on information available from classes in the first compilation unit and from classes that are outside the first compilation unit that are visible in a specified classpath (§2.1, Proposition 2.3); and

allocating at least one object that is created by an instruction marked as no escape by the escape analysis mechanism to an invocation stack frame for a method that allocates the at least one object (§2.1, Proposition 2.3).

22.   As per claim 9, Whaley teaches the invention as claimed, including in an object oriented computer program that comprises a first compilation unit and at least one other compilation unit, a method for allocating objects in the first compilation unit to memory, the method comprising the steps of:

creating two versions of code for a selected object method, a first version using stack allocation of objects (§7.2) and a second version using heap allocation of objects (§§1.1, 7.2); and

selecting at run time one of the first and second versions to execute at run time based on a determination of whether classes seen at run time match expected classes within predetermined limits (§§1.2, 7.2, 8.1).

23.   Choi teaches the invention as claimed, including the method further comprising:

marking each instruction that allocates a new object as one of global escape, no escape, and arg escape based on information available from classes in the first compilation unit and from classes that are outside the first compilation unit that are visible in a specified classpath (§2.1, Proposition 2.3).

24.   As per claim 13, Choi teaches the invention as claimed, including the program product of claim 10 wherein the compiler comprises:

an escape analysis mechanism that marks each instruction in the first compilation unit that allocates a new object as one of global escape, no escape, and arg escape based on information available from classes visible in the first compilation unit (§2.1, Proposition 2.3); and

an object allocation mechanism that allocates at least one object that is created by an instruction marked as no escape by the escape analysis mechanism to an invocation stack frame for a method that allocates the object (§2.1, Proposition 2.3).

25.   As per claim 14, Choi teaches the invention as claimed, including the program product of claim 13 wherein the escape analysis mechanism marks each instruction in the first compilation unit that allocates a new object as one of global escape, no escape, and arg escape based on information available from classes visible in the first compilation unit (§2.1, Proposition 2.3) and from classes that are outside the first compilation unit that are visible in a specified classpath (§§2.1, Proposition 2.3; 4).

26.   As per claim 16, Whaley teaches the invention as claimed, including a program product comprising:

(A)   a compiler that compiles a first compilation unit comprising a plurality of object oriented classes that are part of an object oriented program (§1.2), wherein the object oriented program is defined by the combination of the first compilation unit and at least one other compilation unit (§§ 3.1, 3.2), the compiler comprising:

(A3)   a code generator that creates two versions of code for a selected object method, a first version using stack allocation of objects (§7.2) and a second version using heap allocation of objects (§§1.1, 7.2); and

(A4)   a run time code selector that selects one of the first and second versions to execute at run time based on a determination of whether classes seen at run time match expected classes within predetermined limits (§§1.2, 7.2, 8.1); and

(B)   signal bearing media bearing the compiler (Abstract).

27.   Choi teaches the invention as claimed, including the compiler further comprising:

(A1)   an escape analysis mechanism that marks each instruction that allocates a new object as one of global escape, no escape, and arg escape based on information available from classes in the first compilation unit and from classes that are outside the first compilation unit that are visible in a specified classpath (§2.1, Proposition 2.3); and

(A2)   an object allocation mechanism that allocates at least one object that is created by an instruction marked as no escape by the escape analysis mechanism to an invocation stack frame for a method that allocates the object (§2.1, Proposition 2.3).

28.   As per claim 17, Whaley teaches the invention as claimed, including the program product of claim 16 wherein said signal bearing media comprises recordable media (Abstract).

29.   As per claim 18, Whaley teaches the invention as claimed, including the program product of claim 16 wherein said signal bearing media comprises transmission media (Abstract).

Conclusion

30.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (571) 272-3769. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Syed Ali
October 19, 2004
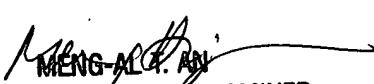
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